

Life Cycles of Stars—Part 2

Red Giant Stage

As the hydrogen in the core of a low-mass star is used up, the core starts to collapse. The core of the star becomes denser and hotter. The increased temperature causes another kind of nuclear reaction. Helium is converted to carbon. This nuclear reaction gives off great amounts of energy, causing the star to expand. It becomes a red giant. **STOP** The red giant stage in a star's life is relatively short. The sun will be a main-sequence star for a total of 10 billion years. But the sun will be a red giant for only about 500 million years. **STOP**

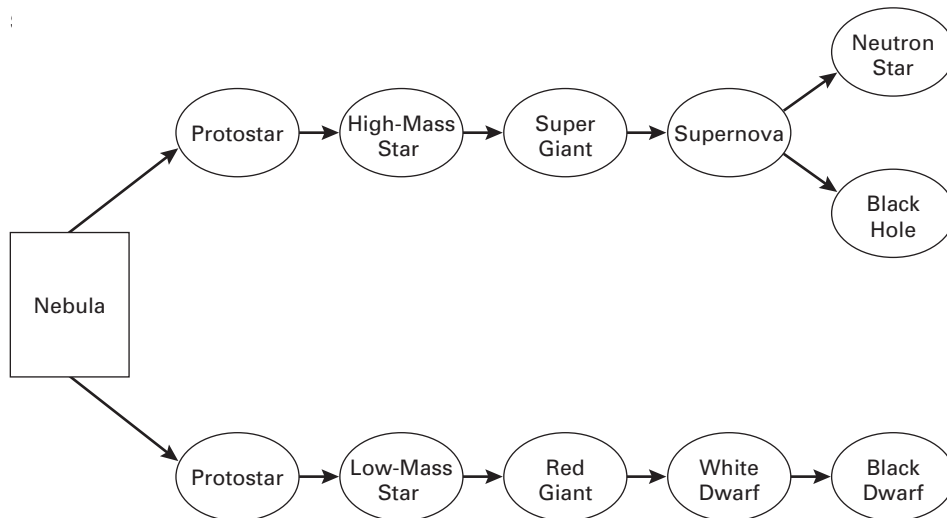
Dwarf Stage

Eventually, most of the helium in a red giant's core is changed into carbon. Nuclear fusion slows. The star cools, and gravity makes it collapse inward. The matter making up the star is squeezed together very tightly, and the star becomes a white dwarf. **STOP** A typical white dwarf is about the size of Earth. But its matter is far denser than any matter on Earth. Eventually, the star becomes a burned-out black chunk of very dense matter that gives off no visible light. Then it is called a black dwarf. **STOP**

Life of a High-Mass Star

Stars more than six times as massive as the sun have a very different life cycle than low-mass stars. A high-mass star uses up its hydrogen at a much faster rate. After only about 50 to 100 million years, a high-mass star has no hydrogen left. At this time, the core collapses and the outer layers expand greatly. The star becomes a super giant. **STOP** Eventually, the core of the super giant can no longer stand the pressure of the outside layers of the star. The outside layers crash in very suddenly, causing a tremendous explosion that gives off an extraordinary amount of light. Great shells of gases fly off the star. The star becomes a supernova. A supernova explosion is the most violent event known to happen in the universe. **STOP**

Stellar Evolution



After a supernova explodes, only the tiny core of the star remains. This core, made up of neutrons, is called a neutron star. Neutron stars are extremely dense. Astronomers hypothesize that after a massive star undergoes a supernova explosion, it may also become a black hole. A black hole is so dense and its gravity is so strong that nothing can escape from it, not even light. Do black holes really exist? So far, scientists have no real proof. Black holes do not release light so they can't be observed directly. **STOP**

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